

REMARKS

This paper is responsive to the Office Action mailed October 27, 2008. In the present Amendment, claims 1 and 3 are amended; claims 2 and 4-21 are cancelled. Thus, upon entry of this Amendment, claims 1 and 3 will be pending, of which claim 1 is independent. Claim 1 has been amended to incorporate features of presently cancelled claim 2. Claim 3 has been amended to correct a formal matter. Thus, Applicants submit that no new matter has been introduced by the present amendments and respectfully request entry of the claims.

Claim Rejections - 35 U.S.C. § 103

The Office Action rejects claims 1, 3, 4, 10, 18, 20, and 21 as obvious and therefore unpatentable under 35 U.S.C. § 103 over KIKUCHI (U.S. 5,753,353) in view of TOSHIRO (JP05-226620).

Applicants note that claims 4, 10, 18, 20, and 21 are cancelled in this amendment. Thus, Applicants' remarks responsive to the rejection under the combination of KIKUCHI in view of TOSHIRO are directed to claims 1 and 3 of the pending application.

Applicants note that the cited documents do not disclose:

- A manufacturing method of an SOI wafer, comprising:
 - preparing a supporting wafer comprising boron by an amount of 9×10^{18} atoms/cm³ or more;
 - forming a rear surface insulating film on one surface of said supporting wafer;
 - ion-implanting of hydrogen gas or a noble gas element to an active layer wafer to thereby form an ion-implanted layer in said active layer wafer;
 - bonding said active layer wafer with the other surface of said supporting wafer via an insulating film interposed therebetween to thereby form a bonded wafer; and then

heat treating said bonded wafer to thereby induce cleavage in a portion of said bonded wafer at the site of the ion-implanted layer as an interface to thereby form an SOI layer with said remaining active layer wafer for manufacturing said SOI wafer.

KIKUCHI and TOSHIRO are directed to providing an SOI substrate through polishing/grinding to form a silicon active layer and not by way of ion implantation, heating, and cleaving. Thus, Applicants respectfully submit that the rejections of claims 1 and 3 based on these documents are moot.

SAKAGUCHI expressly states at Col. 3, lines 25-28, that an “object of the [SAKAGUCHI] invention is to provide a process for manufacturing a semiconductor thin film which is free from defects peculiar to a bulk silicon wafer, such as OSFs...” (emphasis added). Applicants submit that the disclosure of SAKAGUCHI is at odds with the disclosures of KIKUCHI. The Office Action noted that KIKUCHI disclosed implantation of boron (Office Action, page 3) which leads to the creation of OSF, contrary to the stated object of SAKAGUCHI. KIKUCHI, at Col. 1, line 67 – Col. 2, lines 1-4, also discloses a high concentration of oxygen of 1.5×10^{18} atoms/cm³ for a typical wafer utilized by the inventors (and not limited by the disclosure of KIKUCHI). The use of this concentration of oxygen is contrary to the express limitation of SAKAGUCHI, which utilizes an amount of 5×10^{17} atoms/cm³ or below. Applicants respectfully submit that an oxygen concentration as disclosed by KIKUCHI would undermine the object of SAKAGUCHI of obtaining an SOI substrate that is free of oxidation induced stacking faults. Thus, Applicants respectfully submit that, based solely on technical considerations, these documents are cannot be properly combinable.

Applicants note that the method of manufacturing an SOI wafer by forming an active layer (by ion implantation, heating, and cleaving) and forming an oxide film on the rear surface of the supporting wafer, prevents outward diffusion of the boron from the rear surface of the supporting wafer containing high boron concentration and thereby prevents warp, is not demonstrated by any of the references, singly or combined.

Applicants further note that using the methods described in the pending claims, a thickness of the SOI layer is less than 0.10 μm , thereby allowing for a highly precise LPD evaluation.

Yet further, warpage of the SOI wafer can be suppressed. Specifically, since the SOI layer is thin (at less than 0.10 μm), the BOX (buried oxide film) is likely to cause warpage in the SOI wafer. The rear surface oxide film contributes to the warpage in the direction reverse to that of the BOX, depending on the thickness of the BOX on the front surface side. Thereby, the amount of the SOI wafer warpage can be reduced.

Applicants submit that none of the cited documents provides for the above noted features of the pending application. Applicants respectfully submit that claims 1 and 3 are not rendered obvious by the cited documents.

The Office Action rejects claims 2 and 19 as unpatentable over KIKUCHI in view of TOSHIRO, further in view of SAKAGUCHI (U.S. 6,613,678). Applicants note that claims 2 and 19 are cancelled in this amendment. Thus, Applicants submit that the rejections of these claims are moot.

The Office Action rejects claims 9 and 11-17 as unpatentable over KIKUCHI in view of TOSHIRO, further in view of SAMATA (U.S. 6,008,110). Applicants note that claims 9 and 11-

17 are cancelled in this amendment. Thus, Applicants submit that the rejections of these claims are moot.

CONCLUSION

For all the above reasons, it is respectfully submitted that all pending claims are patentable over the documents employed in the rejections of record. Applicants request reconsideration and withdrawal of the rejections of record. Allowance of the application with an early mailing date of the Notices of Allowance and Allowability is therefore respectfully requested.

If there should be any questions, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully Submitted,
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